



7th International Artillery and Indirect Fire Symposium & Exhibition

Raymond Lam

PM Intelligence & Effects (PM IE)

Of

**PEO Command, Control & Communications Tactical
(PEO C3T)**

June 19, 2002



Topics

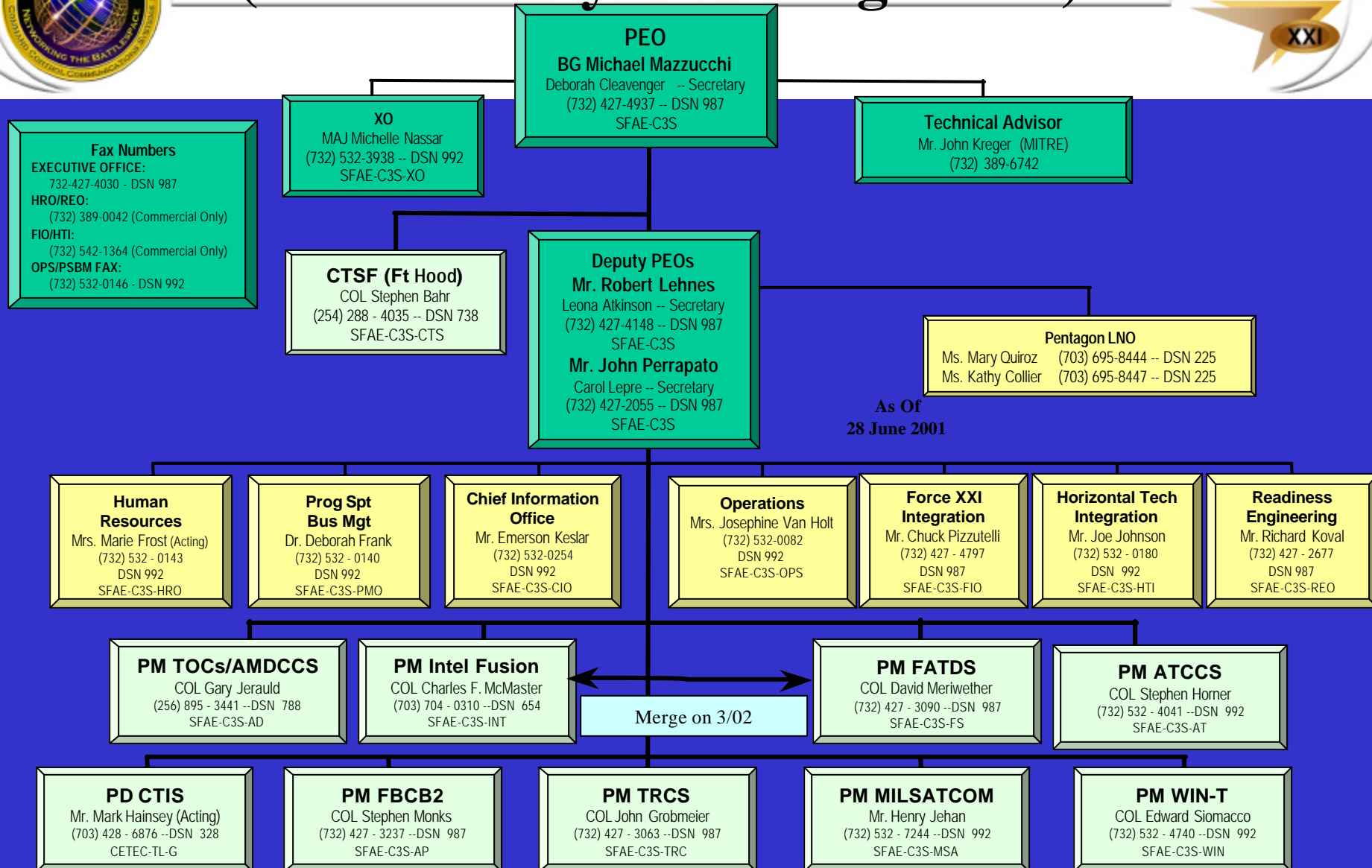


- **PEO C3T Organization**
- **PM - Intelligence & Effects (PM IE) Organization**
- **PM IE Products (Effects Systems) that supports Army Objective Force**
 - **Advanced Field Artillery Tactical Data System (AFATDS)**
 - **Pocket-Sized Forward Entry Device (PFED)**
 - **Light Weight Tactical Fire Direction Systems (LWTFDS)**
 - **Gun Display Unit Replacement (GDU-R)**
 - **Lightweight Forward Entry Device (LFED)**



PEO C3S

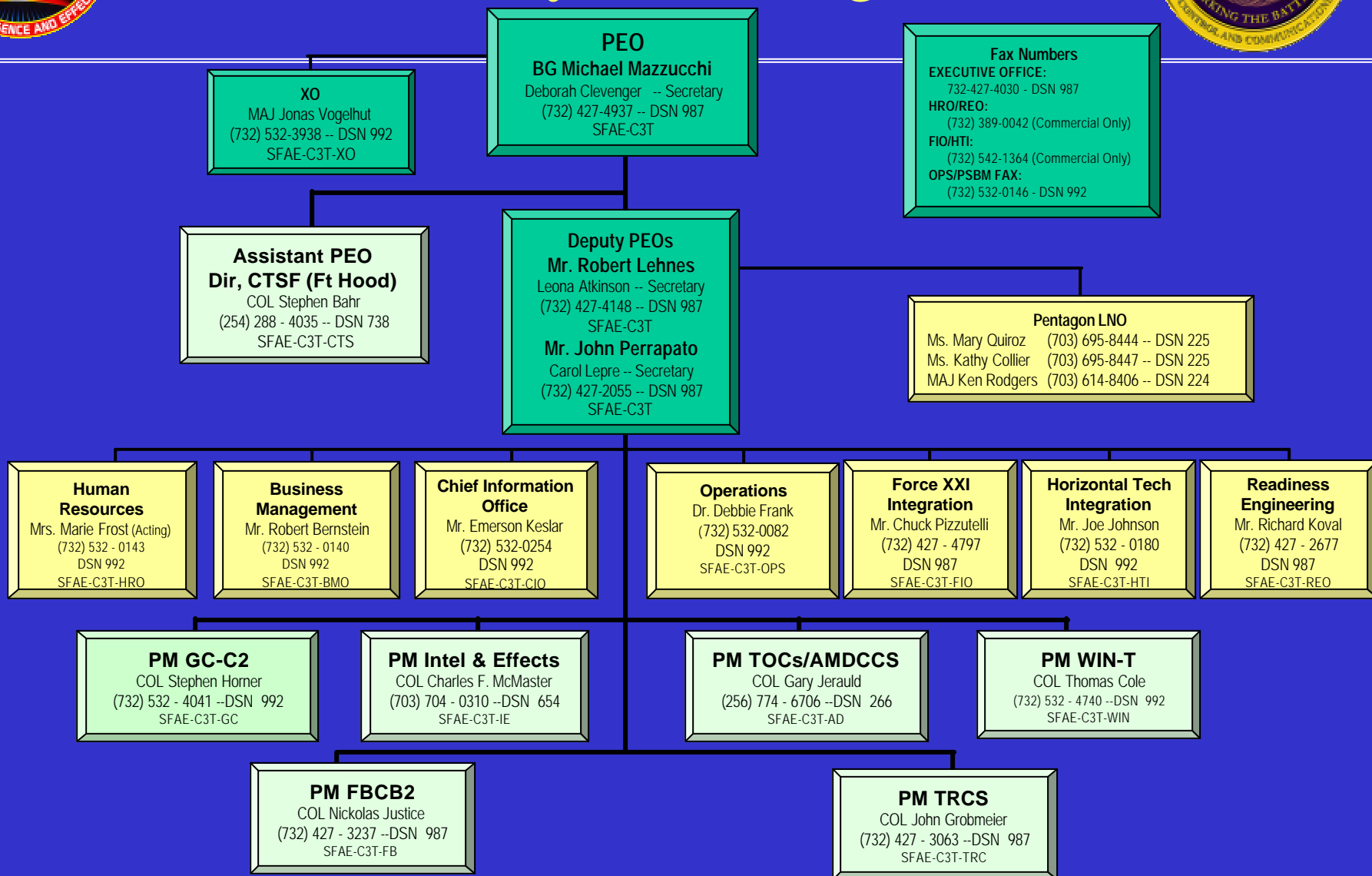
(Before Army PEO Alignment)





PEO C3T

(After Army PEO Alignment)





PM Intelligence and Effects (PM IE)



- Project Manager of PM IE - COL Charles McMaster
 - Deputy Project Manager for Intelligence Systems (Ft Belvoir, VA)- Mr. Wes Welch
 - Deputy Project Manager for Effects Systems (Ft Monmouth, NJ)- Mr. Arthur Santo-Donato
- PdM Fire Support (Advanced Field Artillery Tactical Data System)- LTC Dan Hughes
- PdM ASAS (All Source Analysis System)- LTC Jim Ralph
- PD LFED/PFED- Mr. Jeffrey Weiss
- PD Technical Fire Control- Mr. Milton Eng
- PD IMETS (Integrated Meteorological System)- Mr. Bob Dickenshied



Effects Systems Office

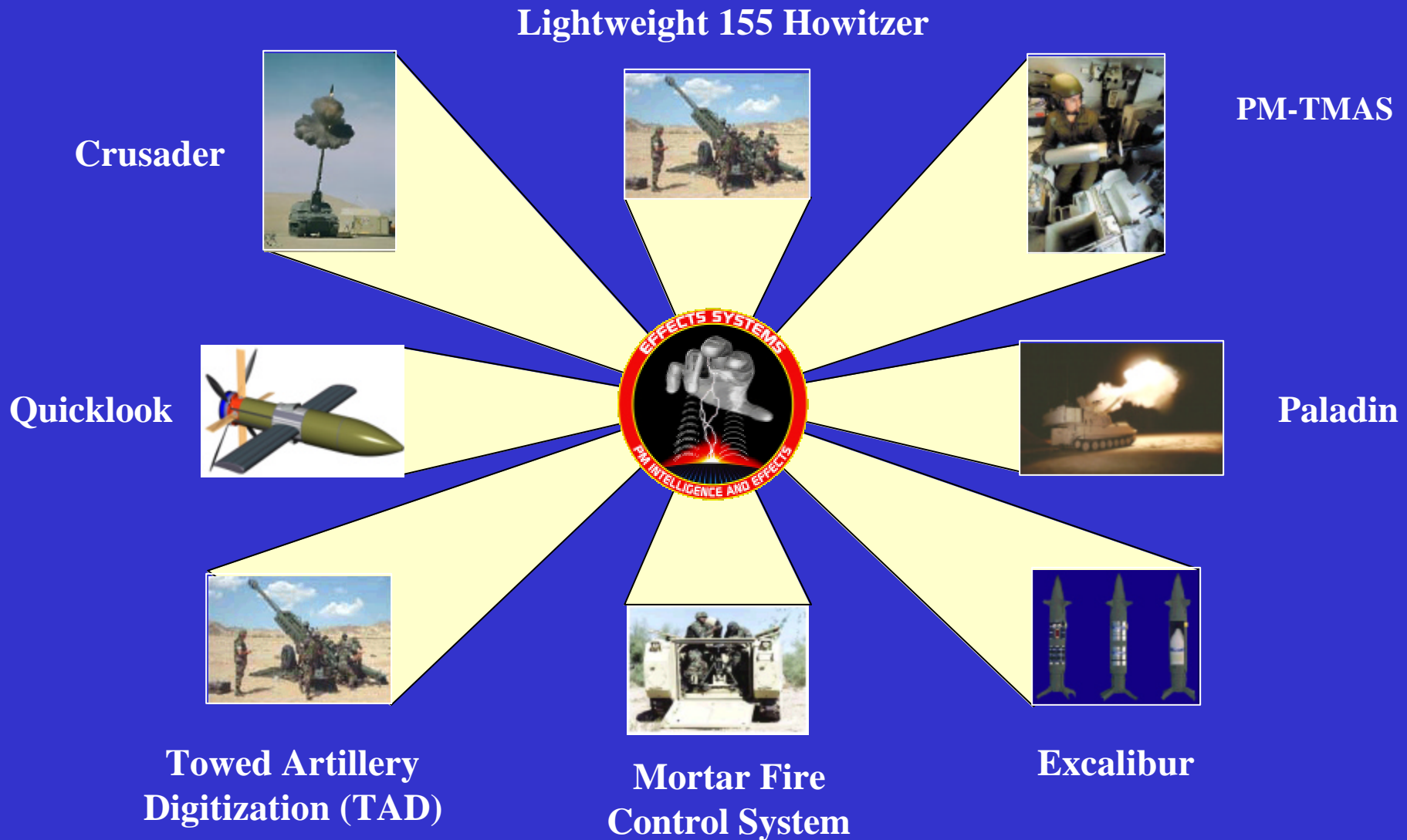
Mission & Products



- To develop, acquire and field battlefield information systems that provide the Army and Joint Warfighter with superior Command and Control (C2) capabilities designed to delivery of land-, air- and sea-based effects and fires across all echelons of the Transition and Objective Force.
- Effects Systems Office Products
 - Objective Force
 - Block 3 AFATDS/Effect Control System (ECS)
 - Pocket-Sized Forward Entry Device (PFED)
 - Light Weight Tactical Fire Direction Systems (LWTFDS)
 - Gun Display Unit Replacement (GDU-R)
 - Lightweight Forward Entry Device (LFED)
 - Interim Force
 - Block 2 AFATDS
 - Battery Computer System (BCS)/Fire Direction System (FDS)
 - Forward Entry Device (FED)
 - Legacy Force
 - Initial Fire Support Automated System (IFSAS)
 - Transition to CECOM by May 2001



Major Picatinny Arsenal Interactions





AFATDS Hardware Configurations

Dual UltraSparc Computer
Unit (UCU) in M1068



Compact Computer
Unit 2 (CCU2) in Soft top



Compact Computer Unit 2
(CCU2) in Rigid Wall Shelter



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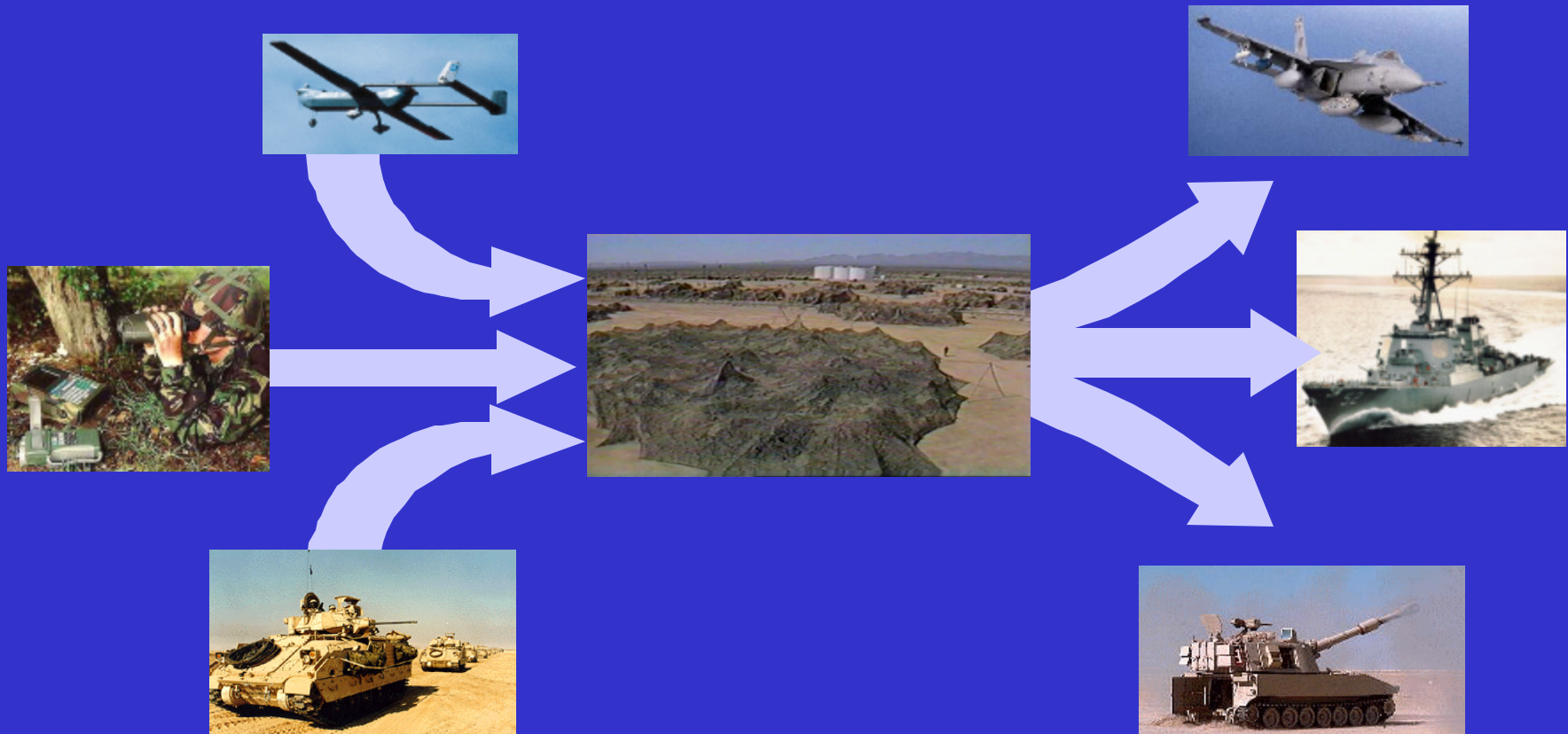
AFATDS History

- IOT&E passed Sep 1995
- Materiel Release approved Dec 1996
- Hardware Contract through Product Manager Common Hardware, Ft. Monmouth
- Original contract awarded 1990
- New contract awarded 1999
- Same Software Contractor but with different names
 - Magnavox (1984) --> Hughes Defense (1996)-->Raytheon (1998)



What is AFATDS

A Multi-Service (US ARMY / USMC)
Integrated Battlefield Management and Fire Support C2 System





AFATDS Mission



- Coordinate Air, Land and Sea based Indirect Fire Systems to support Maneuver operations
- Calculate Optimal Fire Support Solution to attack the right target(s), at the right time with right weapon and munition(s)
- Starting with AFATDS version 6.3 (formerly known as A99), Technical Fire Solution will also be provided



AFATDS Automates the Weapon Selection Process



Commanders Guidance:

Target Selection Standards **Target Filtering Criteria**

Priority of Fires

- Analyzing available Fire Support Assets
- Analyzing targets
- Applying Commander's Guidance

Fire Support Assets:

Location	Weapon Type	Ammo Status
Readiness	Range	

Area of Operations

Enemy Unit Locations **Friendly Unit Locations**

Fire Support Coordination Measures



**Optimum Fire
Support System**



AFATDS Interoperability

US Air Force

- Contingency Theater Automated Planning System
- Theater Battle Management Core System
- Air Support Requests / Air Tasking Orders



US Navy

- Global Command & Control System - Maritime
- Coordination of Naval Surface Fire Support
- Provides Tactical Land Picture to Naval Forces

US Army

- ABCS Command & Control Systems
Maneuver Air Defense Intelligence Combat Support
- Global Command & Control System - Army
- Force XXI Battle Command Brigade & Below
 - Attack Helicopters
- Field Artillery / Fire Support Automated Systems
- Ground and Airborne Sensor Systems



Allied

Artillery Systems Cooperation Activities



Germany



United Kingdom



United States



Italy



France

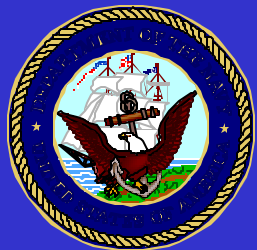
Communications

- All Army Tactical Communications Media (EPLRS, NTDR, SINCGARS, MSE, etc.,)
- Satellite Communications
- US Message Text Formatting
- Joint Variable Message Format
- MIL-STD-188-220B





Joint / Combined Program Initiatives



- US Marine Corps involvement
- On-going efforts with the US Navy
- Interoperability with the US Air Force
- NATO/Allied interoperability





USMC Initiatives



- Co-Developer of AFATDS
 - Key role in defining AFATDS requirements
 - Marine Corps functionality major portion of A98 Software release
- AFATDS software provides for unique USMC terminology/requirements (implemented at system initialization)



Navy Initiatives

- AFATDS has been actively involved in US Navy Exercises since 1996
- Interoperable with GCCS-M
- Navy functionality added to AFATDS to support NFCS interface:
 - SH/FZ combinations for Navy conventional munitions
 - JVMF Messages defined in AFATDS/NFCS ICD
 - Representation of Naval units to support multiple weapons platforms (e.g., ERGM, LASM)
 - Basic guidance in AFATDS to support LASM and ERGM
 - Incorporation of Navy Symbology



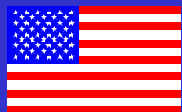
Air Force Initiatives

- AFATDS/CTAPS interface briefed at Army - Air Force Warfighter Talks, Dec 1995
 - Interface implementation accelerated by the CSA / CSAF
- Initial AFATDS/TBMCS interface testing conducted at the DT level in January 1999
- Successful DT/OT conducted October 1999 including successful load-test of the AFATDS/TBMCS Interface
- AFATDS actively participating in continued TBMCS testing (MOTE on-going)



International Initiatives

- AFATDS is a key element in the Artillery Systems Cooperation Activities (ASCA)
- Purpose: To achieve interoperability among the Fire Support C2 Systems of the five participating nations
- Interoperability is governed by the ASCA Common Technical Interface Design Plan (CTIDP)



United States



France



United Kingdom



Germany



Italy



AFATDS Baseline Software



Block I

Block II

**Original
Contract
(1990)**

A96

A97

A98

V6.X

Base Contract
Delivery

Option 1

Option 2

Option 3

Block II

Block III

**New
Contract
(1999)**

V7

V8

V9

Base Contract
Delivery

Option 1

Option 2

Effects
Control
System
(ECS)



AFATDS Baseline Software Functionality



- Block I reflected the functionality described in the original ORD dated August 1993
- Block II began in FY98, and reflects the coordinated ABCS system with simultaneous vertical requirements and horizontal interoperability requirements including the incorporation of Battery Computer System (BCS)/Fire Direction System (FDS) functionality into AFATDS
- Block III will reflect the future C3 demands of the Objective Force as AFATDS evolves into the Effects Control System (ECS) and will interoperate with the ABCS family and other systems



Pocket-Sized Forward Entry Device (PFED)



Product Director - Mr. Jeffrey Weiss, (732) 427-3365



What is PFED

- The Pocket-Sized Forward Entry Device (PFED) is a Windows CE based Rugged-Handheld Device that provides "Calls for Fire" and Surveillance capabilities for dismounted warfighters such as Forward Observers and Fire Support Teams
- Interoperable with AFATDS and Legacy FS Systems
- USMC DACT program joining PFED effort under auspice of J-PFED MOU with MCSC
- Booz Allen Hamilton is the software prime contractor
 - HW provider has not been finalized, but will be placed on PdM Common Hardware contract (First fielded units are being developed by Talla-Tech)
- Hand-on user evaluation is scheduled for late 2002



PFED System Configuration



PFED System Components



PFED Remote Unit



PFED Junction Box



Headset and Microphone



**Equipment shown for illustrative
purposes only.
Subject to change.**

Compatible with Fielded Equipment



PLGR



Viper



D-MELIOS



SINGARS ASIP



PFED Configuration (July 02 Release)



- Front-end
 - Bluetooth to LASER Range Finder
 - Bluetooth to Junction Box
 - Internal/Bluetooth/Phonojack Microphone
- Junction Box
 - Serial to PLGR
 - SPTCIM to ASIP
 - Bluetooth to Front-end



PFED Configuration (First Fielded Version)



- **Front-end (Bluetooth Enabled)**
 - GPS Embedded
 - Wireless to Headset
- **Junction Box (Bluetooth Enabled)**
 - Wireless to LASER Range Finder
 - Wireless to Front-end
 - SPTCIM/TACLINK wired to ASIP
 - Ability to connect to existing PLGR via Serial Port



Personal Digital Assistant (PDA) Roadmap











- Compaq iPAQ 3600 Series
 - 206 MHz Intel StrongARM SA-1110
 - 64 MB RAM
 - 16 MB Flash ROM
 - Operating Temperature 32°F – 104°F
 - 1 Serial Port
 - 4096 Color Touch Sensitive Reflective Thin Film Transistor (TFT) LCD
 - 950 mAh Lithium Polymer Rechargeable Battery
- Compaq iPAQ 3700 Series
 - + 32 MB Flash ROM
- Compaq iPAQ 3800 Series
 - + 65,536 color TFT LCD
 - + 1400 mAh Lithium Polymer Rechargeable Battery
 - + Embedded Bluetooth Circuitry



PFED Schedule



Tasks	FY01	FY02	FY03	FY04
Contract Awarded				
Unit Evaluation				
System Integration Completed				
TCR (July)				
Formal Test (July 15-30)				
System Integration Completed				
Materiel Release				
First Unit Equipped (FUE)				



LWTFDS



Product Director - Mr. Milton Eng, (732) 427-3991



LWTFDS



LWTFDS High Level HW Requirements

- MS Pocket PC 2002 OS
- 64 MB memory (Anticipate 128 MB memory by Mid 2002)
- StrongArm Processor
- 1/4 VGA Display
- PCMCIA, Serial output SP-TCIM
- Current Plan is using same PFED HW for development



What is LWTFDS

- The Light Weight Tactical Fire Direction Systems (LWTFDS) is a light weight, ruggedized, hand held technical fire direction computer that provides technical solution (NABK based ballistic computation) for cannon systems
- The LWTFDS system is initially intended as a Back-up Computer System (BUCS) replacement
- Raytheon/Indianapolis is the system integrator
- Hand-on user evaluation is scheduled for late 2002



LWTFDS Operation

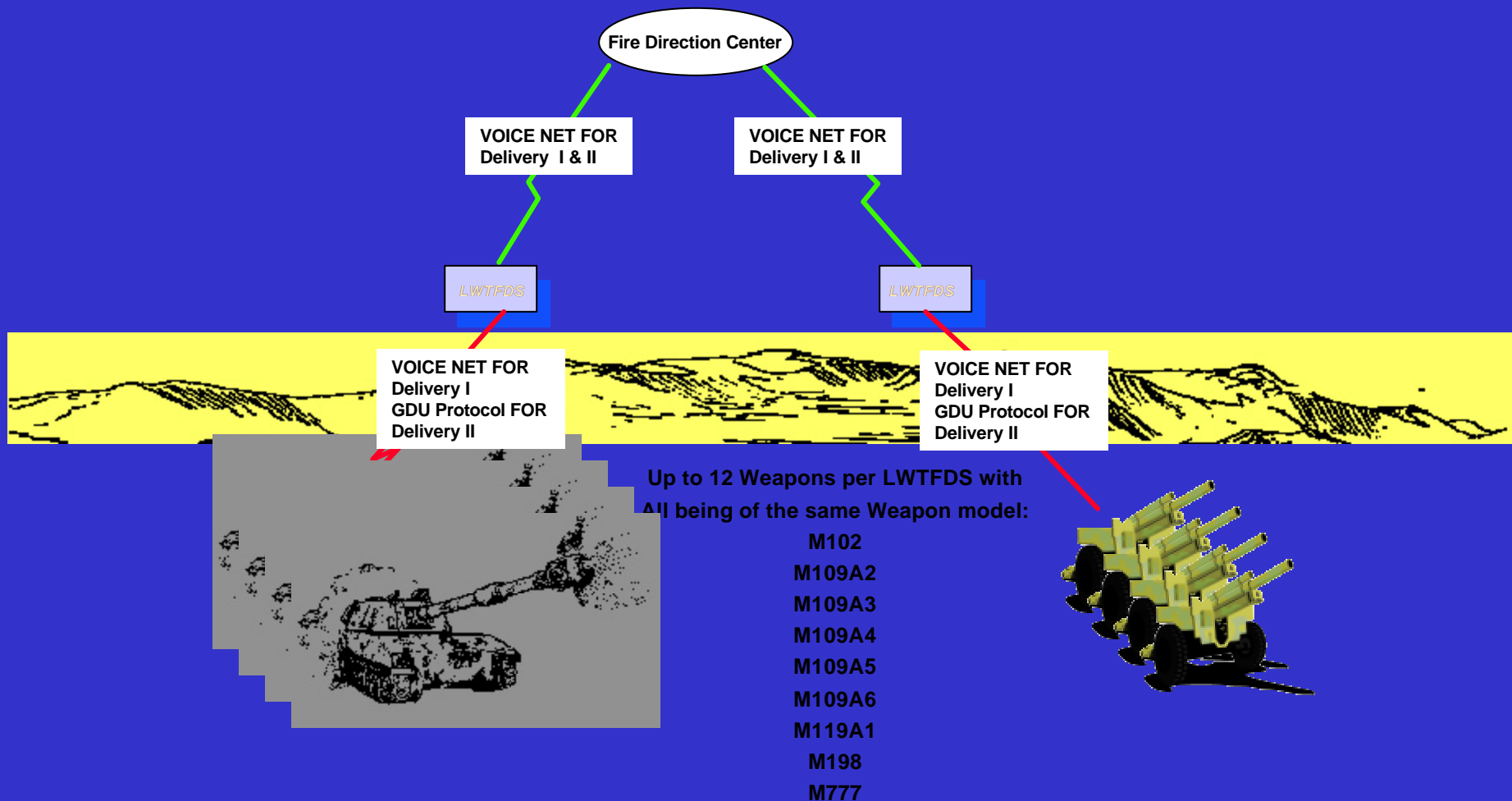


- Provide “Light Forces” (Airborne, Air Assault, Light Infantry Divisions) an immediate digital technical Fire Direction during initial entry operations on a hand-held platform
- Provide all US Army Cannon Artillery units an independent check for ballistic computation solutions
- Designed only to be a Technical Solution for Cannon Systems - Not a tactical fire support system



LWTFDS Application

LWTFDS provide Technical Fire Control of Towed and Self-Propelled Cannon systems of the US Military





System Capability

- Initiate Fire Mission from operator entered data
 - FFE (Low/High Angle)
 - Adjust (Low/High Angle)
 - Assign Priority (FPF, Copperhead)
 - Registrations (Precision, HB/MPI)
- Integrate NABK version 3.02 (support MACS/MOFA)
- Store of operator entered data for:
 - Fire Unit and Other Unit data
 - MET - Std MET and up to 2 Computer METs (1 current and 1 alternative)
 - Target data (up to 99 targets)
 - Map MOD
- Enable operator to view computed ballistics solutions



System Capability (Continued)



- LWTFDS will also provide:
 - a mission status monitor
 - operator capability for subsequent mission command
 - operator view and control of registration missions
 - a Safety-T calculator
 - a printer interface
 - a wireline GDU interface
 - computation of gun locations from battery center
 - a MVV calculator using operator entered data
 - Weapon and Aimpoint selection logic



LWTFDS Functional Evolution



Delivery I

FOCUS:

- **BASIC TECHNICAL FIRE DIRECTION CAPABILITY**

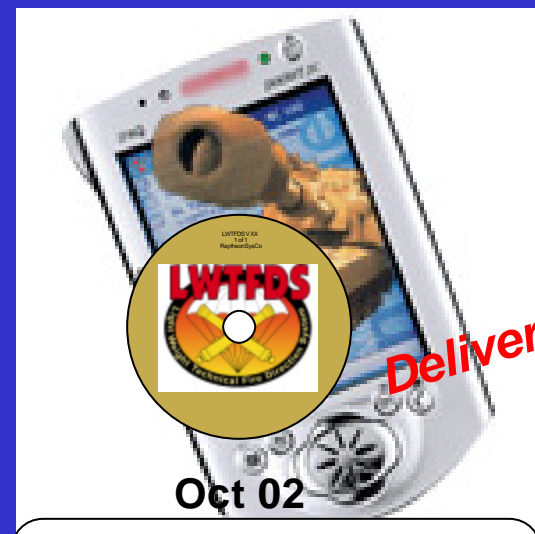
Built around the NABK software.

Validate solutions do not violate operator entered Safety-T.

Fire Mission types supported

- **FFE**
- **Adjust**
- **Assign Priority**
- **Registration**

Supports All US Cannon Projectiles, Propellants and Fuzes.



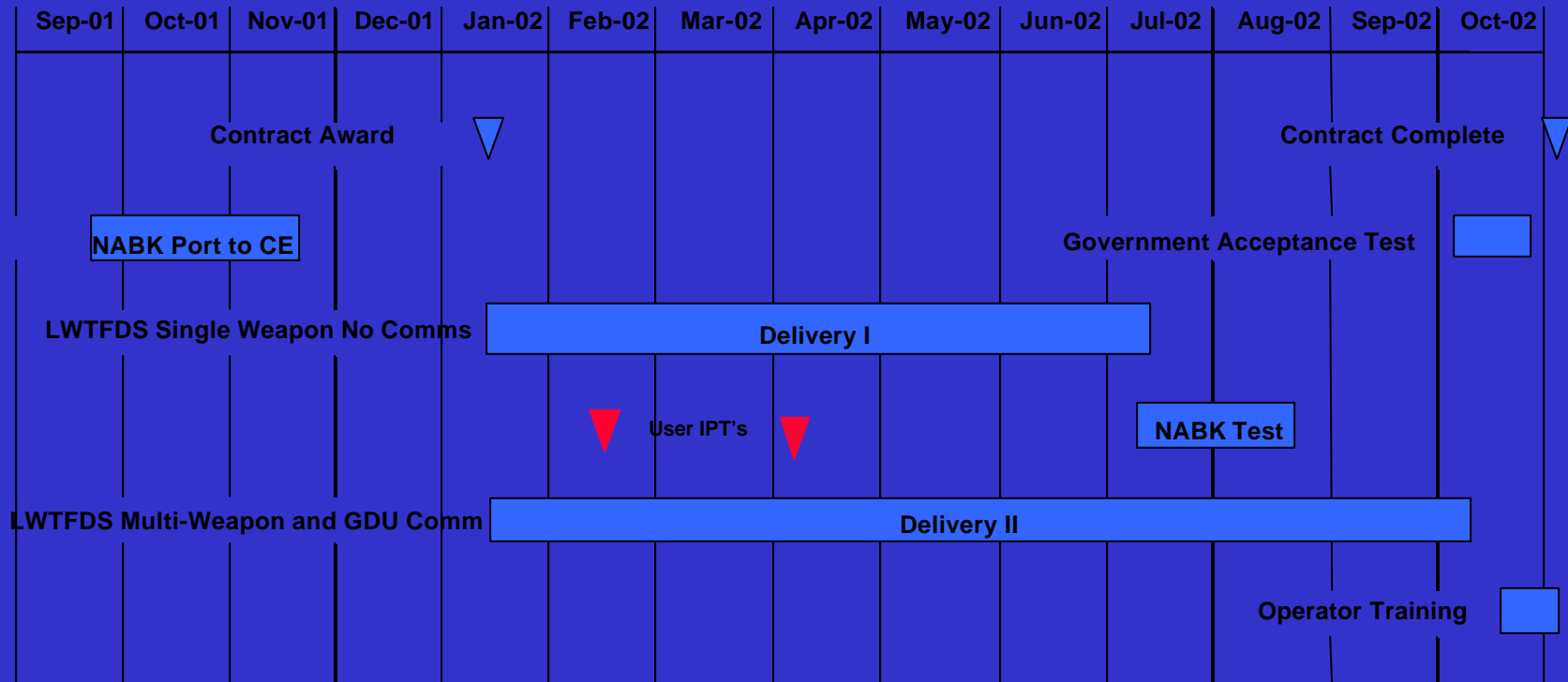
Delivery II

FOCUS:

- **ADD MULTI-WEAPON SOLUTIONS**
- **ADD DIGITAL COMM WITH GDUs**



LWTFD Schedule





Gun Display Unit Replacement (GDU-R)



Product Director - Mr. Milton Eng, (732) 427-3991



GDU-R



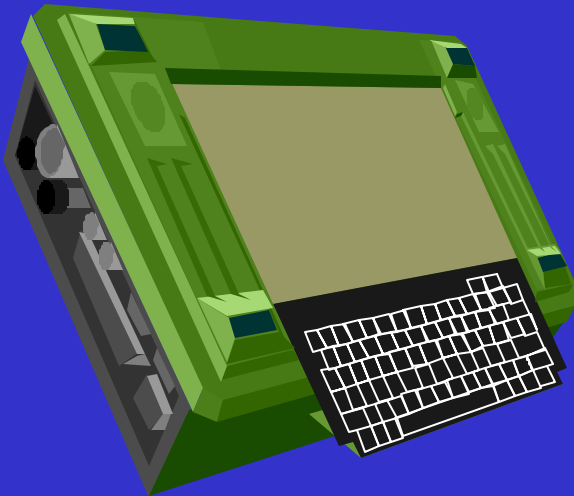
- According to the CECOM Logistics Readiness Center (LRC) Sustainment Manager for GDUs: “There are currently only five (5) self-propelled howitzer-type and one (1) towed howitzer-type Condition “A” stock GDUs that remain available for issue and they are no longer available for acquisition”
- PM I&E (PM-EFCCS) proactively assumed the GDU Replacement (GDU-R) mission back in May 01
- The GDU-R will fix the obsolete and unsupportable GDU hardware that is currently being sustained within the Depot System through inconsistent parts cannibalization
- The GDU-R will leverage the hardware and communications capabilities of the existing Windows CE-based PFED and the hand-held technical fire control capability of the LWTFDS
- The GDU-R will also be required for near- and mid-term Brigade Combat Team (BCT) towed artillery fieldings occurring prior to late-FY06 (i.e. scheduled commencement of TAD fieldings).
- PM I&E has been unsuccessful in its repeated attempts to obtain the necessary GDU-R funding for this high priority readiness initiative.



Lightweight Forward Entry Device (LFED)



Handheld Terminal Unit (HTU)



**Lightweight Forward Entry
Device (LFED) in FISTV**



Ruggedized Handheld Computer (RHC)



Stand-alone Computer Unit (SCU)



Product Director - Mr. Jeffrey Weiss, (732) 427-3365



LFED



- The LFED is a lightweight solution for infantry platoon Forward Observers (FO's), Combat Observation Lasing Teams (COLT's) and FA Survey Parties to pass fire control and fire support information to all subscribers identified in FM 6-20-40 and FM 6-20-50
- Current LFED configurations include
 - Handheld Terminal Unit (HTU) AN/PSG-9
 - Ruggedized Handheld Computer (RHC) AN/PSG-11
 - Lightweight Computer Unit (LCU) AN/GYK-37
 - Stand-alone Computer Unit (SCU) (FY 03)
- Material Released on 29 July 1999



Program Schedule (LFED/FED)



Tasks	FY01	FY02	FY03	FY04
Handheld Terminal Unit (HTU) Fielding				
HTU LUE				
Lightweight Computer Unit (LCU) Fielding				
LCU LUE				
Ruggedized Handheld Computer (RHC) - MR				
RHC - FUE				
RHC - Fielding				
Stand-alone Computer Unit (SCU) - MR				
SCU- FUE				
SCU- Fielding				
<div> <div>LUE-Last Unit Equipped</div> <div>MR-Materiel Release</div> <div>FUE-First Unit Equipped</div> </div>				



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Integrated Product Team 99+

Integrated Product Team AV7

(m) - Matrix ++ - Admin Officer % - Property Book ** - Building Custodian // - Safety Officer >> - Fire Warden # - Mail Control Officer